

REMARKS

Claims 1-6 are pending in this application. Reconsideration of the rejections in view of these amendments and the following remarks is respectfully requested.

Rejections under 35 USC §112, Second Paragraph

Claim 1 was rejected under 35 USC §112, second paragraph, as being indefinite.

Claim 1 has been amended to overcome this rejection.

Rejections under 35 USC §103(a)

Claims 1 and 3-6 were rejected under 35 U.S.C. §103(a) as being obvious over Hayashi (EP 0 990 587 A2) in view of Kume et al (EP 0 979 723 A2).

Applicants respectfully traverse this rejection.

Hayashi and Kume et al have been mentioned in the present specification in the background of the invention. The present specification, at page 9, lines 7 to 23, described as follows:

It can be said that the heat-sealing apparatuses described in the aforementioned Japanese Patent Laid-Open Nos. 53110/2000 and 103413/2000 have high quality as a heat-sealing apparatus, however, even with the use of these high quality heat-sealing apparatuses, its heat-sealing performance had not always been sufficient under severe conditions such as with a fluid. For example, when a vegetable juice abundant in water-insoluble vegetable fiber is high-frequency heat-sealed with a fluid by using the aforementioned heat-sealing apparatuses, although the cause is unknown, there were cases wherein products with defective sealing were detected at a proportion of a few to a million. An object of the present invention is to provide a very high quality heat-sealing apparatus capable of achieving an excellent heat-sealing, wherein no defective sealing is generated even when heat-sealing under

severe conditions with a fluid, such as when filling/packing a vegetable juice abundant in water-insoluble vegetable fiber.

It should be noted that the above-mentioned Japanese Patent Laid-Open No. 103413/2000 is a Japanese counterpart to Hayashi, and Japanese Patent Laid-Open No. 53110/2000 is a Japanese counterpart to Kume et al, which have been cited by the Examiner in the Office Action. Thus, the object of the present invention is to eliminate defects in the conventional apparatuses described in Hayashi and Kume et al.

Regarding the high-frequency heat-sealing and the shape of the sealed zone, the present specification describes, at page 17, lines 5 to page 18, lines 2, as follows:

In a high-frequency heat-sealing apparatus, as mentioned above, a high-frequency heating mechanism is used as means for heating a tubular packing material, and this high-frequency heating mechanism is equipped with a high-frequency coil 22, as mentioned previously. Fig. 4 is a diagram explaining a sealed zone when high-frequency heat-sealing is effected, and Fig. 5 is an enlarged diagram of a portion of its former. As shown in Figs. 4 and 5, when an electric current flows in a high-frequency coil 22 formed in the sealing jaw 23, a high-frequency electromagnetic field is generated around the high-frequency coil and induces an eddy current in a conductive material such as an aluminum foil, so that heat is generated in the conductive material by the eddy current to heat and melt a thermoplastic resin adjacent to the conductive material. The eddy current thus induced forms a round electric circuit at the two end portions of the conductive material such as the aluminum foil, thereby rounding the heated regions of the two right and left side portions of the tubular packing material 21 and the width of the thermoplastic material layer to be melted at the two end portions is narrowed. As a result, the sealed zone is rounded and narrowed at its two right and left side portions 26 in the longitudinal direction and the width of the sealed zone is made narrower than at its non-side portion 27.

Regarding the ridge formed on the action face, the present specification describes, at page 19, lines 6 to 22, as follows:

In the high-frequency heat sealing apparatus in the present invention, as the ridge 31 shaped to contain a partial curve formed on the action face of the high-frequency coil, there are no particular limitations as long as it can press the central portion of the sealed zone, including the two right and left side portions where the width of the sealed zone is rounded and narrowed. The aforementioned ridge having the partial curve can be exemplified either by one continuous linear ridge 31 wherein the ridge is formed also on the non-side portion, as shown in Fig. 6, or by two short ridges 32 wherein the ridge is not on the non-side portion but only on the two right and left sides, as shown in Fig. 7. By forming these ridges, it is possible to prevent reliably the sealing from being defective due to formation of a tunnel, as might otherwise be caused either by the two right and left folded ends of the tubular packing material pressed or by the creases (or folds) formed in advance in the packing material.

The present specification further describes, at page 23, line 15 to page 24, line 8, as follows:

... in the high-frequency heat-sealing apparatus in the present invention, a ridge 31 is equipped in the central portion of the sealed zone whereby the distance from the ridge 31 to the edge end portion of the ridge side of the groove 34 equipped in the container's interior side and the distance from the ridge 31 to the edge end portion of the ridge side of the flash portion 33 equipped in the cutting side are approximately equal, and a groove 34 (preferably a groove 34 that is adjacent to an inclined action face 36) and a flash portion 33 are equipped, whereby the pressure added by the ridge 31 is applied almost equally to the molten thermoplastic resin extruded to both sides of the ridge 31, and the molten thermoplastic resin can be guided to flow without resistance to both outer sides of the sealed zone. Consequently, it is believed that the flow of the molten resin extruded to the container's interior side and the molten resin extruded to the cutting side becomes smoother, thereby attaining a satisfactory heat-sealing even when heat-sealing under severe conditions with a fluid.

The present invention has eliminated the above-mentioned defects. Claim 1 of the present application, as amended, recites as follows:

A high-frequency heat-sealing apparatus for making a container shaping a packing material of a laminate including a thermoplastic resin layer and a conductive material layer into a tubular shape and for heat-sealing said tubular packing material transversely together with a fluid, comprising:

a first pressing member; and

a second pressing member openable and closable together with said first pressing member,

wherein, each of the first and second pressing members having an action face,

wherein one of the first and second pressing member including a high-frequency heating mechanism, a surface of said heating mechanism being flush with the action face and defining a portion of the action face,

wherein a ridge containing a curved portion is so formed on the action face of a high-frequency heating mechanism the ridge being capable of pressing a central portion of a sealed zone having two rounded and narrowed right and left sides,

wherein a groove is so formed on the action face adjacent to the outer side on the container's interior side of a sealed zone that a molten thermoplastic resin puddle is formed along said groove, and

wherein a flash portion for a molten thermoplastic resin is formed adjacent to the outer side on the cutting side of the high-frequency coil.

A significant feature of the present invention is a combination of "wherein a ridge containing a curved portion is so formed on the action face of a high-frequency heating mechanism the ridge being capable of pressing a central portion of a sealed zone having two rounded and narrowed right and left sides, wherein a groove is so formed on the action face adjacent to the outer side on the container's interior side of a sealed zone that a molten thermoplastic resin puddle is formed along said groove, and wherein a flash portion for a molten

thermoplastic resin is formed adjacent to the outer side on the cutting side of the high-frequency coil."

Although Hayashi discloses a ridge, Hayashi does not teach or suggest "wherein a groove is so formed on the action face adjacent to the outer side on the container's interior side of a sealed zone that a molten thermoplastic resin puddle is formed along said groove."

The "ridge containing a curved portion . . . formed on the action face of a high-frequency heating mechanism the ridge being capable of pressing a central portion of a sealed zone having two rounded and narrowed right and left sides" is formed based on the fact that, in the heat-sealing apparatus, the heated regions of the two right and left side portions of the tubular packing material is rounded and the width of the thermoplastic material layer to be melted at the two end portions is narrowed. A close look at the end portions of a sealed zone shown in Fig. 6 of the present invention reveals that a ridge which presses the central portion of a sealed zone is shaped to contain a partial curve.

Kume et al describes that "the location to form the ridge can be suitably selected to be near the container's interior side or the cutting side, if it is within the zone to be sealed." (Page 5, column 7, lines 16 to 19 in European patent application EP0979723). Thus, although Kume et al discloses a ridge formed on an action face of a high-frequency coil for the purpose of preventing defective sealing, it does not specify the position where the ridge is formed. It does not teach or suggest that a ridge which can press the central portion of a sealed zone in consideration of the rounded and narrowed right and left sides of the tubular packing material is formed in the high-frequency heat-sealing apparatus.

By "pressing the central portion of a sealed zone", the present invention brings about a remarkable effect that the flow of the molten resin extruded to the cutting side becomes smoother, thereby attaining a satisfactory heat-sealing even when heat-sealing under severe conditions with a fluid.

For at least these reasons, claim 1 patentably distinguishes over Hayashi and Kume et al. Claims 3-6, depending from claim 1, also patentably distinguish over Hayashi and Kume et al for at least the same reasons.

Claim 2 was rejected under 35 U.S.C. §103(a) as being obvious over Hayashi in view of Kume et al, and further in view of Iwano et al (EP 0 730 946 A2).

Iwano et al has been cited for allegedly disclosing an inclined action face so that the interval of the paired pressing members when pressed gradually broadens as it goes toward the groove. Such disclosure, however, does not remedy the deficiencies of Hayashi and Kume et al.

Thus, claim 2, depending from claim 1, also patentably distinguish over Hayashi, Kume et al and Iwano et al.

Double Patenting Rejection

Claims 1-6 were provisionally rejected under the doctrine of obviousness-type double patenting as being unpatentable over claims 1, 4 and 6 of copending Application No. 10/067,828 in view of Iwano et al (EP 0 730 946 A2).

To overcome the obviousness-type double patenting rejection, a terminal disclaimer has been attached hereto.

Response under 37 C.F.R. §1.111
Attorney Docket No. 011775
Serial No. 10/067,883

In view of the aforementioned amendments and accompanying remarks, claims, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP

A handwritten signature in black ink, appearing to read "Sadao Kinashi", written in a cursive style.

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